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A Site Classification and "Quick-cruise" Volume Table for Climax Stands

The most practical indicator of site quality in the climax forests of Southeast Alaska is the average number of 16-foot logs in the trees above average stand diameter. It readily shows what the area has been able to produce in the past and should therefore indicate its relative future productiveness. It has the advantages of being easy to determine, eliminates the numerous small, low-volume trees and is not influenced by degree of stocking. It is restricted to the major species and represents about one-third of the stems and at least two-thirds of the volume.

Five "log-height" classes are used to represent the timbered lands. The 2-log site represents the poorest, Site Class 5, or Scrub. Any area having less than a 1½ log average height would probably be a muskeg type with a very small volume. The 6-log site represents the best for climax stands. Although taller stands can be found they will probably be sawtimber spruce, relatively even-aged and limited in area.

Within a given site class the number of trees 8 inches and larger is the most variable and has the greatest influence on gross volume. Defect[1/] decreases from nearly 50 percent on Site 5 to less than one-third of the gross volume on Site 1.

Diameter growth is essentially uniform within all sites and diameter classes, averaging about .08 inches per year over the past 40-year period. Volume growth is therefore dependent on the number and size of trees in the stand. Species composition is reflected by the site with spruce reaching 41 percent of the volume on the best and redcedar forming 56 percent on the poorest sites. The stand characteristics of each site class are summarized in Table 1.

To obtain a rapid, reliable volume estimate of pulpwood stands in reconnaissance surveys or extensive pulptimber cruising, a count of the number of trees and an estimate of the average stand diameter are sufficient. These can easily be determined on tenth-acre plots arranged in the usual cruising methods. This will permit the cruiser to make an on-the-spot appraisal. With a notation of the amount of cull and species composition the stand condition is recorded for later reference. Table 2 shows the gross stand volume in cubic feet for each site class with different degrees of stocking and a range in average diameters. Applied to line-plot data taken in cruising two large areas the estimated volumes checked the actual plot volumes with a standard error of estimate of approximately 11 percent and an aggregate difference of less than 1 percent.

1/ Defect includes sound portion of culled trees; in others it includes visible defect and an allowance for hidden defect and breakage.

March 1951 R. M. Godman

Table 1.—Site class characteristics as indicated by "log height" of trees above average dbh. Per acre basis.

	Site Class				
	5	4	3	2	1
	2 logs	3 logs	4 logs	5 logs	6 logs
Cu. Vol. 12" dbh and larger - Gross	1,609	3,534	6,257	9,532	14,305
Cull	724	1,308	2,127	3,146	4,291
Net	885	2,226	4,130	6,386	10,014
Cu. Vol. 8" dbh and larger - Gross	2,037	3,971	6,586	9,727	14,449
Cull	915	1,460	2,243	3,256	4,392
Net	1,122	2,511	4,343	6,471	10,057
% Cull	45	37	34	33	30
Average dbh 8" and larger	14.9	17.0	20.5	24.2	26.5
Basal area, square feet	130	170	233	294	389
No. trees 1" to 7" incl.	71	67	55	32	21
" " 8" to 11" incl.	44	37	26	18	14
" " 12" and larger	54	68	76	74	87
Total No. trees 8" and larger	98	105	102	92	101
No. live culls 8" and larger	18	12	10	10	9
Percent culls 8" and larger	18	11	10	11	9
Cubic foot growth per year	9	23	48	67	73
Cubic foot mortality per year	6	9	13	13	20
Spacing, trees 8" dbh and larger in feet	21	20	21	22	21
Spacing, live culls in feet	49	60	66	66	70
No. 16-foot logs, Merchantable	122	213	259	277	379
Cull	28	49	31	32	33
Total	150	262	290	309	412
Average log height, trees 8" dbh +	1.6	2.6	2.9	3.5	4.3
Percent volume by species - Spruce	4	8	9	16	41
Hemlock	25	57	71	74	49
Cedar	56	30	20	10	10
Other	15	5	0	0	0
Average Girard Form Class (16-foot)	78	82	84	85	87
Basis, No. plots	12	21	68	64	16

Table 2.—Gross cubic volume by number of trees, average dbh and log height.[1/]

DBH	Number of Trees 8" dbh and larger per acre								
	140	130	120	110	100	90	80	70	60
	Gross Cubic Volume per acre to 6" top								
	2 LOGS - Site 5 - Scrub								
10	1,525	1,416	1,307	1,198	1,089	980	871	762	653
12	1,984	1,842	1,700	1,559	1,417	1,275	1,134	992	850
14	2,579	2,395	2,210	2,026	1,842	1,658	1,474	1,289	1,105
16	3,307	3,071	2,834	2,598	2,362	2,126	1,890	1,653	1,417
18	3,984	3,700	3,415	3,131	2,846	2,561	2,277	1,992	1,708
20	4,760	4,420	4,080	3,740	3,400	3,060	2,720	2,380	2,040
	3 LOGS - Site 4								
12	3,080	2,860	2,640	2,420	2,200	1,980	1,760	1,540	1,320
14	3,900	3,622	3,343	3,065	2,786	2,507	2,229	1,950	1,672
16	4,806	4,463	4,120	3,776	3,433	3,090	2,746	2,403	2,060
18	5,921	5,498	5,075	4,652	4,229	3,806	3,383	2,960	2,537
20	7,314	6,791	6,269	5,746	5,224	4,702	4,179	3,657	3,134
22	9,100	8,450	7,800	7,150	6,500	5,850	5,200	4,550	3,900
	4 LOGS - Site 3								
16	5,936	5,512	5,088	4,664	4,240	3,816	3,392	2,968	2,544
18	7,420	6,890	6,360	5,830	5,300	4,770	4,240	3,710	3,180
20	9,040	8,394	7,748	7,103	6,457	5,811	5,166	4,520	3,874
22	10,794	10,023	9,252	8,481	7,710	6,939	6,168	5,397	4,626
24	12,817	11,901	10,986	10,070	9,155	8,239	7,324	6,408	5,493
	5 LOGS - Site 2								
20	10,286	9,551	8,816	8,082	7,347	6,612	5,878	5,143	4,408
22	12,418	11,531	10,644	9,757	8,870	7,983	7,096	6,209	5,322
24	14,802	13,745	12,688	11,630	10,573	9,516	8,458	7,401	6,344
26	17,436	16,190	14,945	13,699	12,454	11,209	9,963	8,718	7,472
28	19,944	18,520	17,095	15,671	14,246	12,821	11,397	9,972	8,548
	6 LOGS - Site 1								
22	14,658	13,611	12,564	11,517	10,470	9,423	8,376	7,329	6,282
24	17,402	16,159	14,916	13,673	12,430	11,187	9,944	8,701	7,458
26	20,034	18,603	17,172	15,741	14,310	12,879	11,448	10,017	8,586
28	22,652	21,034	19,416	17,798	16,180	14,562	12,944	11,326	9,708
30	25,396	23,582	21,768	19,954	18,140	16,326	14,512	12,698	10,884

Av. form class by log-height class: 2-78; 3-82; 4-84; 5-85; 6-87
Av. cull factor by log-height class: 2-45; 3-37; 4-34; 5-33; 6-30

1/ Area above block lines will have less than 2,400 cubic feet per acre net volume when average cull factor for site applied. Volumes less than this are considered unmerchantable for pulptimber.

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